INTERMEDIATE EXAMINATION

GROUP II

(SYLLABUS 2012)

SUGGESTED ANSWERS TO QUESTIONS
DECEMBER 2017

Paper- 10: COST AND MANAGEMENT ACCOUNTANCY

Time Allowed: 3 Hours **Full Marks: 100**

The figures in the margin on the right side indicate full marks.

All workings must form part of your Answer. Assumptions, if any, must be clearly indicated.

Please: 1. Write answers to all parts of a question together.

2. Open a new page for answer to a new question.

3. Attempt the required number of questions only.

SECTION – A

(25 Marks)

Answer *Question No. 1* which is compulsory.

1. Answer all questions:

(a) Choose the correct answer from the given four alternatives to fill in the gap. 1×5=5

(i) _____ is an innovation introduced for the first time in the world and India with a view to regulate industries on Healthy and sound line.

(A) Cost Audit

(B) Cost Accountancy

(C) Cost investigation

(D) Cost Accounting

(ii) Cost Audit u/s 233-B is to be conducted only when __________ directs such an audit.

(A) Board of Directors

(B) Share Holders

(C) Central Government

(D) Company Law Tribunal

(iii) In the initial year cost Audit was taken merely as a tool for __________ for consumer.

(A) Price Fixation

(B) Price control Mechanism

(C) Cost Control

(D) Fair Price Product

(iv) ______ is to provide for any future decrease in price etc., so that the benefit may be passed on to the contractee.

(A) Reserve Clause

(B) Escalation Clause

(C) Contract clause

(D) Retrospective Clause

(v) A system of accounting under which separate ledger are maintained for Cost and Financial Accounts is called __________.

(A) Integrated Accounting System

(B) Non- Integrated Accounting System

(C) Contra Entry System

(D) Double Entry System

(b) State whether the following statements are True or False: 1×5=5

(i) The term Administered Price was introduced by Marshall.

(ii) Out of Pocket Cost are very much relevant in a consideration of Price Fixation during Trade Recession.

(iii) Contract Costing is often termed as a variant of the Job Costing System.

(iv) Costing in a Transport Industry consist of determining the Marginal and Standard Cost of vehicle.

(v) Throughput is the excess of Sales Value over the Total Cost.

(c) Match Column 'A' with Column 'B' 1×5= 5

Column 'A'		Column 'B'	
1.	Sunk Cost	(A)	Discretionary Cost
2.	Managed Cost	(B)	Marginal Cost
3.	Shut Down Cost	(C)	Historical Cost
4.	Relevant Cost	(D)	Fixed Cost
5.	Variable Cost	(E)	Cost for specific situation

(d) (i) What types of health Services are covered under the Companies (Cost record and Audit) Rule 2014?

(ii) Which Rules govern maintenance of Cost Accounting Records and Cost Audit as per Section 148 of the Companies Act, 2013? 3+2=5

(e) A company possesses two manufacturing plants, each of which can produce three products X, Y and Z from a common raw material. However, the proportions in which the products are produced are different in each plant and so are the plant's operating costs per hour. Data on production per hour and operating cost per hour, together with current orders on hand for each product are given below.

Product				Operating cost per hour ₹
	X (Units)	Y (Units)	Z (Units)	
Plant A	2	4	3	9
Plant B	4	3	2	10
Orders on hand	50	24	60	

You are required to formulate the LPP model with the given data. You are *not to* solve the LPP problem. **5**

Answer: 1 (a)

(i) (A) Cost Audit

(ii) (C) Central Government

(iii) (B) Price Control Mechanism

(iv) (B) Escalation Clause

(v) (B) Non- Integrated Accounting System

Answer: 1 (b)

(i) False (Keynes)

(ii) True.

(iii) True

(iv) False (Operating Cost)

(v) False (Total Variable Cost)

Answer: 1 (c)

Column 'A'		Column 'B'	
1.	Sunk Cost	(C)	Historical Cost
2.	Management Cost	(A)	Discretionary Cost
3.	Shut Down Cost	(D)	Fixed Cost
4.	Relevant Cost	(E)	Cost for specific situation
5.	Variable Cost	(B)	Marginal cost

Answer: 1 (d)

(i) The Companies (Cost Records and Audit) Rules covers "**Health services, namely functioning as or running hospitals, diagnostic centres, clinical centres or test laboratories".**

Any Company engaged in providing Health services through functioning as or running hospitals, diagnostic centres, clinical centres, test laboratories, physiotherapy centres and post-operative/ treatment centres are covered within the ambit of the Companies (Cost Records and Audit) Rules 2014. Further, companies running hospitals exclusively for its own employees are excluded from the ambit of these Rules, provided however, if such hospitals are providing health services to outsiders also in addition to its own employees on chargeable basis, then such hospitals are covered within the ambit of these Rules.

It is clarified that companies engaged in running of Beauty parlours / Beauty treatment are not covered under these Rules.

(ii) The Central Government issued Companies (Cost Records and Audit) Rules, 2014 On June 30 2014. Subsequently, it issued Companies (Cost Records and Audit) Amendment Rules, 2014 on 31st December, 2014. The Amendment Rules has introduced certain changes to the original Rules issued on 30th June, 2014. The Companies (Cost Records and Audit) Rules read with the Amendment Rules, 2014 are now applicable and governs the maintenance of cost accounting records and cost audit as per Section 148 of the Companies Act, 2013.

Answer: 1 (e)

Let α be the no. of hours of plant A in use.
Let β be the no. of hours of plant B in use.

Objective Function: Min Z = 9a + 10 β

Subject to constraints:

$2\alpha + 4\beta \geq 50$

$4\alpha + 3\beta \geq 24$

$3a + 2\beta \geq 60$

$\alpha, \beta \geq 0$ (Non-negativity factor)

SECTION – B

(Cost and Management Accounting — Methods & Techniques of Cost Records & Cost Audit)

Answer *any three* questions. 17× 3=51

2. (a) Ambuja Enterprises is currently working at 50% capacity and produces 10,000 units. At the current operating level, the product costs ₹180 per unit and is sold at ₹ 200 per unit. The cost of ₹180 is made up as follows:

	₹
Material	**100**
Wages	**30**
Factory overheads	**30 (40% Fixed)**
Administrative overheads	**20 (50% Fixed)**

At 60% working, raw material cost increases by 2% and the selling price falls by 2%.

At 80% working, raw material cost increases by 5% and the selling price falls by 5%.

Prepare a Marginal Cost Statement showing the estimated profit of the business when it is operated at 60% and 80% capacity.

(b) In a purely competitive market, 10,000 pocket transistors can be manufactured and sold and a certain profit can be generated. It is estimated that 2,000 pocket transistors need to be manufactured and sold in a monopoly market to earn the same profit.

Profit under both the conditions is targeted at ₹ 2,00,000. The variable cost per transistor is ₹100 and the total fixed cost is ₹37,000.

You are required to find out the unit selling price both under monopoly and competitive situations. 9+(4+4) = 17

Answer: 2 (a)

Statement of Marginal Cost

	50% Capacity	60% Capacity	80% Capacity
	10,000 units	12,000 units	16,000 units
	₹	₹	₹
Materials	10,00,000	12,24,000	16,80,000
Wages	3,00,000	3,60,000	4,80,000
Variable Overheads			
Factory	1,80,000	2,16,000	2,88,000
Administration	1,00,000	1,20,000	1,60,000
Total Marginal cost	15,80,000	19,20,000	26,08,000
Sales	20,00,000 (10,000 × ₹200)	23,52,000 (12,000 × ₹196)	30,40,000 (16,000 × ₹190)
Total Contribution	4,20,000	4,32,000	4,32,000
Less: Fixed Cost	2,20,000	2,20,000	2,20,000
Profit	2,00,000	2,12,000	2,12,000

Answer: 2 (b)

Under Monopolistic Conditions:

Suppose X is the selling price per unit

∴ sale	= 2,000 X
Variable cost	= 2,000 × ₹100 = ₹2,00,000
Fixed Cost	= ₹37,000
Desired Profit	= ₹2,00,000
Or 2,000 X – 2,00,000	= 37,000 + 2,00,000
Or X = 4,37,000/2,000	= ₹218.50 per unit

Under Competitive Conditions:

Suppose Y is the selling price per unit

∴ sale	= 10,000 Y
Variable cost	= 10,000 × ₹100 = ₹10,00,000
Fixed Cost	= ₹37,000
Desired Profit	= ₹2,00,000
Or 10,000 Y – 10,00,000	= 37,000 + 2,00,000
Or Y = 12,37,000/10,000	= ₹123.70 per unit (Ans.)

3. (a) Draw up a Flexible Budget for overhead expenses on the basis of the following data and determine the overhead rates at 70%, 80% and 90%.

Plant Capacity	**At 80% Capacity ₹**
Variable Overheads:	
Indirect labour	**12,000**
Stores, including spares	**4,000**
Semi Variable Overheads:	

Power (30% - Fixed; 70% - Variable)	**20,000**
Repairs (60% - Fixed; 40% - Variable)	**2,000**
Fixed Overheads:	
Depreciation	**11,000**
Insurance	**3,000**
Salaries	**10,000**
Total Overheads	**62,000**
Estimated Direct Labour Hours	**1,24,000**

(b) The standard costs of a certain chemical mixture is as follows:

40% Material A at ₹200 per ton
60% Material B at ₹300 per ton
A standard loss of 10% is expected in production.
During a period, they used—
90 tons of Material A at the cost of ₹180 per ton
110 tons of Material B at the cost of ₹ 340 per ton
The output is 182 tons of good production.

Calculate and present Material Yield Variance, Material Mix Variance, Material Price Variance and the Material Cost Variance. 7+10=17

Answer: 3 (a)

Flexible Budget at Different capacities and Determination of Overhead rates.

Particulars	70%(₹)	80%(₹)	90%(₹)
(A) Variable Overheads:			
Indirect Labour	10,500	12,000	13,500
Stores including spares	3,500	4,000	4,500
Total(A)	14,000	16,000	18,000
(B) Semi-Variable Overheads			
Power (See Note)	18,250	20,000	21,750
Repairs (See Note)	1,900	2,000	2,100
Total (B)	20,150	22,000	23,850
(C) Fixed overheads:			
Depreciation	11,000	11,000	11,000
Insurance	3,000	3,000	3,000
Salaries	10,000	10,000	10,000
Total (C)	24,000	24,000	24,000
Grand Total (A+B+C)	58,150	62,000	65,850
Labour Hours	1,08,500 (1,24,000 × 7/8)	1,24,000	1,39,500 (1,24,000 × 9/8)
Overhead rate, per hour (₹)	58,150/1,08,500 = 0.536	62,000/1,24,000 = 0.50	65,850/1,39,500 = 0.472

Working Notes:

Semi – Variable Overheads:

	70%	90%
Power		
Variable	(14,000 × 7/8) = 12,250	(14,000 × 9/8) = 15,750
Fixed	6,000	6,000
Total	18,250	21,750
Repairs:		
Variable	(800 × 7/8) =700	(800 × 9/8) =900
Fixed	1,200	1,200
Total	1,900	2,100

Answer: 3 (b)

Analysis of given data:

Material	Standard data			Actual data		
	Quantity	Price (₹)	Value (₹)	Quantity	Price (₹)	Value (₹)
A	80	200	16,000	90	180	16,200
B	120	300	36,000	110	340	37,400
	200		52,000	200		53,600
Less: Loss	20		-	18		-
	180		52,000	182		53,600

Computation of required values:

Material	**SQSP (1) ₹**	**RSQSP (2) ₹**	**AQSP (3) ₹**	**AQAP (4) ₹**
A	80.88 × 200 = 16,176	16,000	90 × 200 = 18,000	16,200
B	121.33 × 300 = 36,400	36,000	110 × 300 = 33,000	37,400
	52,576	52,000	51,000	63,600

Computation of SQ:

SQ = (RSQ for that product/RSQ for all product) × AQ for that product

For A = (80/180) × 182 = 80.88 units.

For B = (120/180) × 182 = 121.33 units

Where

(1) SQSP = Standard Cost of Standard Material = ₹52,576

(2) RSQSP = Revised Standard Cost of Material = ₹52,000

(3) AQSP= Standard Cost of Actual Material = ₹51,000

(4) AQAP = Actual Cost of Material = ₹53,600

<u>Computation of required variances:</u>

a. Material Yield Variance = (1)- (2) = ₹576 (F) (₹52,576 - ₹ 52,000)
b. Material Mix Variance = (2) - (3) = ₹1 ,000 (F) (₹52,000 - ₹51,000)
c. Material Usage Variance = (1)-(3) = ₹ 1,576(F)(₹ 52,576 - ₹ 51,000)
d. Material Price Variance = (3) - (4) = ₹ 2,600 (A) (₹ 51,000 - ₹53,600)
e. Material Cost Variance = (1) - (4) = ₹ 1,024 (A) (₹52,576 - ₹ 53,600)

4. (a) The management of MJK Limited considers that product Beta, one of its three main lines, is not as profitable as the other two. The selling prices and costs of these products are as follows:

Product	Selling Price (₹)	Direct Material (₹)	Direct Labour		
			Dept. X (₹)	Dept. Y (₹)	Dept. Z (₹)
Alfa	50	10	4	2	2
Beta	40	06	2	4	2
Gamma	45	08	2	2	4

Overhead rates for each department per rupee of direct labour are as follows:

	Dept. X (₹)	Dept. Y (₹)	Dept. Z (₹)
Variable Overhead	1.25	0.50	1.00
Fixed Overhead	1.25	2.00	1.50
	2.50	2.50	2.50

As a Cost and Management Accountant advise the MJK Limited about the profitability of Product Beta. Give reasons.

(b) The successful implementation of a system of budgetary control requires certain pre-requisites. Discuss. 12+5=17

Answer: 4 (a)

MJK Ltd.

	Comparative Profitability Statement					
	Product Alfa		Product Beta		Product Gamma	
	₹	₹	₹	₹	₹	₹
Selling Price		50.00		40.00		45.00
Less: Marginal Cost						
Direct Material	10.00		6.00		8.00	
Direct Labour	8.00		8.00		8.00	
Variable Overhead:						
Dept. X	5.00		2.50		2.50	
Dept. Y	1.00		2.00		1.00	
Dept. Z	2.00	26.00	2.00	20.50	4.00	23.50
Contribution		24.00		19.50		21.50
P/V ratio	$\frac{24.00}{50} \times 100$	48%	$\frac{19.50}{40} \times 100$	48.75%	$\frac{21.50}{45} \times 100$	47.78%

Conclusion: As the PV Ratio of product Beta is the highest. It is the most profitable product line for the company.

Answer: 4 (b)

(i) The objectives, plans and policies of the business should be defined in clear cut and unambiguous terms.
(ii) The output level for which budgets are fixed, i.e., the budgeted output, should be stated.
(iii) The particular budget factor which will be the starting point of the preparation of the various budgets should be indicated.
(iv) There should be an efficient system of accounting to record and provide data in line with the budgetary control system.
(v) For the establishment and efficient execution of the plan, a Budget Committee should be set up.
(vi) There should be a proper system of communication and reporting between the various levels of management.
(vii) There should be a charter of programme. This is usually in the form of a budget manual.
(viii) The budgets should primarily be prepared by those who are responsible for performance.
(ix) The budgets should be complete, continuous and realistic.
(x) There should be an assurance from the top management executives of co-operation and acceptance of the budgetary system.

5. (a) The following information has been obtained from the records of MJ Limited, a manufacturer of Air – conditioner.

		₹
(i)	**Materials per machine**	**1,500**
	Wages per machine	**900**
	Number of machines manufactured and sold	**80**
	Ale price per machine	**4,250**
(ii)	**Works expenses to be charged at 60% of the wages**	
(iii)	**Office expenses to be charged at 20% of works cost**	
(iv)	**There were no stock of machines or work-in-progress at the beginning or at the end of the period**	

As a Cost and Management Accountant prepare a statement showing the profit per machine sold. Also prepare a statement showing the actual profit. Works expenses were ₹ 43,000 and office expenses were ₹48,000 as per the financial records.

You are also required to reconcile the profit as shown by the costing records with that shown by the financial records.

(b) Mritunjay Limited, manufacturing company, provides you cost and sales figures for the first half and second half of 2015-16 as under: **6**

	First half (₹)	Second half (₹)
Sales	**24,00,000**	**30,00,000**
Total Costs	**21,80,000**	**26,00,000**

As a Cost and Management Accountant you have to determine:

(i) Contribution to sales ratio of the Company.

(ii) Annual Fixed Costs.

(iii) Break-even Point.

(iv) Margin of Safety as percentage of sales. **11+6=17**

Answer: 5 (a)

M J Limited
Statement of cost of Air Conditioner

Production: 80 machines	Period…………	
	Total (₹)	Per Unit (₹)
Materials Consumed	1,20,000	1,500
Wages	72,000	900
Prime Cost Works Expenses @ 60% of wages	1,92,000 43,200	2,400 540
Works Cost Office Expenses @ 20% of works cost	2,35,200 47,040	2,940 588
Total Cost Profit (balancing figure)	2,82,240 57,760	3528 722
Sale Price	3,40,000	4250

PROFIT AND LOSS ACCOUNT (FINANCIAL BOOKS)

	₹		₹
To Materials	1,20,000	By Sale proceeds	3,40,000
To Wages	72,000		
To works expenses	43,000		
To Office Expenses	48,000		
To Net Profit	57,000		
	3,40,000		3,40,000

RECONCILIATION STATEMENT

	₹
Profit as per cost accounts	57,760
Add: Over charge of works expenses	200
 Less: Under – charge of office expenses	57,960 960
Profit as per financial account	57,000

Answer: 5 (b)

Mritunjay Limited

(i) Contribution/Sales ratio $= \dfrac{\text{Change in profit}}{\text{Change in sales}} = \dfrac{1,80,000}{6,00,000} \times 100 = 30\%$

(ii) Annual Fixed Cost = [(Sales × PV Ratio) — Profit] × 2
= [(₹ 24,00,000 × 0.30) — 2,20,000] × 2
= [(₹ 7,20,000 — ₹ 2,20,000)] × 2
= ₹5,00,000 × 2 = ₹10,00,000

(iii) Break Even Point $= \dfrac{\text{Fixed Cost}}{\text{PV Ratio}} = \dfrac{10,00,000}{30} \times 100$ = ₹33,33,333

(iv) Margin of safety = ₹54,00,000 – ₹33,33,333 = ₹20,66,667

% of Margin of Safety = 20,66,667/54,00,000 × 100 = 38.3%

6. (a) What are the other Services that a Cost Auditor of a company can provide to the company in which he is appointed as Cost Auditor?

(b) List out Annexures required to be attached along with Form CRA-3 by the Cost Auditors.

(c) Is there any obligation on the part of cost auditor to report offence of fraud being or has been committed in the Company by its officers or employees? 5+8+4=17

Answer: 6 (a)

An auditor appointed under this Act shall provide to the company only such other services as arc approved by the Board of Directors or the audit committee, as the case maybe, but which shall not include any of the following services (whether such services are rendered directly or indirectly to the company or its holding company or subsidiary company, namely: -

(a) accounting and book keeping services;

(b) internal audit;

(c) design and implementation of any financial information system;

(d) actuarial services;

(e) investment advisory services;

(f) investment banking services;

(g) rendering of outsourced financial services;

(h) management services; and

(i) Any other kind of services as may be prescribed.

Provided that an auditor or audit firm who or which has been performing any non-audit services on or before the commencement of this Act shall comply with the provisions of this section before the closure of the first financial year after the date of such commencement.

Explanation — For the purposes of this sub-section, the term "directly or indirectly" shall include rendering of services by the auditor,—

(i) in case of auditor being an individual, either himself or through his relative or any other person connected or associated with such individual or through any other entity, whatsoever, in which such individual has significant influence or control, or whose name or trade mark or brand is used by such individual;

(ii) in case of auditor being a firm, either itself or through any of its partners or through its parent, subsidiary or associate entity or through any other entity, whatsoever, in which the firm or any partner of the firm has significant influence or control, or whose name or trade mark or brand is used by the firm or any of its partners.

Answer: 6 (b)

List of the annexure *need* to be furnished along with Form CRA - 3 :

Annexure has been reclassified into four pans as under;

Part-A

General Information,

General Details of Cost Auditors

Cost Accounting Policy

Product/Service Details -for the company as a whole

Part-B : For Manufacturing Sector

Quantitative Information

Abridged Cost Statement

Details of Materials Consumed

Details of Utilities Consumed

Details of Industry Specific Operating Expenses

Part-C For Service Sector

Quantitative Information

Abridged Cost Statement

Details of Materials Consumed

Details of Utilities Consumed

Details of Industry Specific Operating Expenses

Part-D

Product and Service Profitability Statement

Profit Reconciliation

Value Addition and Distribution of Earnings

Financial Position and Ratio Analysis

Related Party Transactions and

Reconciliation of Indirect taxes.

Answer: 6 (c)

Sub-rule (7) of Rule 6 of the Companies (Cost Records and Audit) Rules 2014 states that " the provisions of sub-section (12) of section 143 of the Act and the relevant rules made thereunder shall apply mutatis mutandis to a cost auditor during performance of-his functions under section 148 of the Act and these rules."

As per sub-section (12) of section 143 of the Companies Act, 2013, extract of which is given above, it is obligatory on the part of cost auditor to report offence of fraud, which is being or has been committed in the company by its officers or employees, to Central Government as per the prescribed procedure under the Rules.

As per the proviso to above sub-section, it has been stated that in case of a fraud, involving lesser than the specified amount, the auditor shall report the matter to the audit committee constituted under section 177 or to the Board in other cases within such time and in such manner, as may be prescribed.

SECTION - C
(Economics for Managerial Decision Making)

Answer *any two* from the following. 12×2=24

7. (a) How are products priced under Monopoly market?
(b) Write about Income Elasticity of demand. 6+6=12

Answer: 7 (a)

The following conditions are essential for the determination of price and output under Monopoly.

- The main aim of the Monopolist is to get the maximum profits. He must produce the goods to that extent where MC becomes equal to MR. At that level he will get the equilibrium position and maximum profits.
- If the monopolist increases the supply of commodities then the average revenue and-, marginal revenue curves fall down from left to right. If he wants to sell more output he must reduce the price level and therefore the revenue curves are falling with the increase of output.
- Under monopoly the AR is equal to the price, so AR is the demand line.
- Under monopoly the MR falls more rapidly than the AR.
- The monopoly on AR line which is more than MR and AC. The differences between AC and AR are the amount of abnormal profits.

Answer: 7 (b)

Income Elasticity of Demand:

The income elasticity of demand explains the proportionate change in income and proportionate change in demand. The rate of change in the demand due to the change in the income is called income elasticity of demand.

Income Elasticity of demand = Proportion change in demand /Proportion change in income.

Types of income elasticity of demand:

1. Zero income elasticity of demand: if the change in the income fails to bring any change in demand, it is called zero income elasticity of demand. (Ey = 0).
2. Negative income elasticity of demand: If the demand decreases with the increase in the income is called negative income elasticity of demand.
3. Unitary income elasticity of demand: [f the proportionate change in the demand is equal to proportionate change in the income, it is called unitary income elasticity of demand (Ey = 1).
4. Income elasticity of demand is greater than one: If the proportionate change in the demand is more than the proportionate change in income, it is called relatively income elastic of demand (Ey >1).
5. Income elasticity of demand is less than one: If the proportionate change in the demand is less than the proportionate change in the income, it is called relatively income inelastic demand (Ey < 1).

8. (a) How is price of a product determined under Perfect Competition? **8**

(b) The cost function of a firm is given by c = $x^3 - 4x^2 + 7x$, find at what level of output Average Cost is minimum and what is that Average Cost. **6+6=12**

Answer: 8 (a)

Price determines action under Perfect Competition:

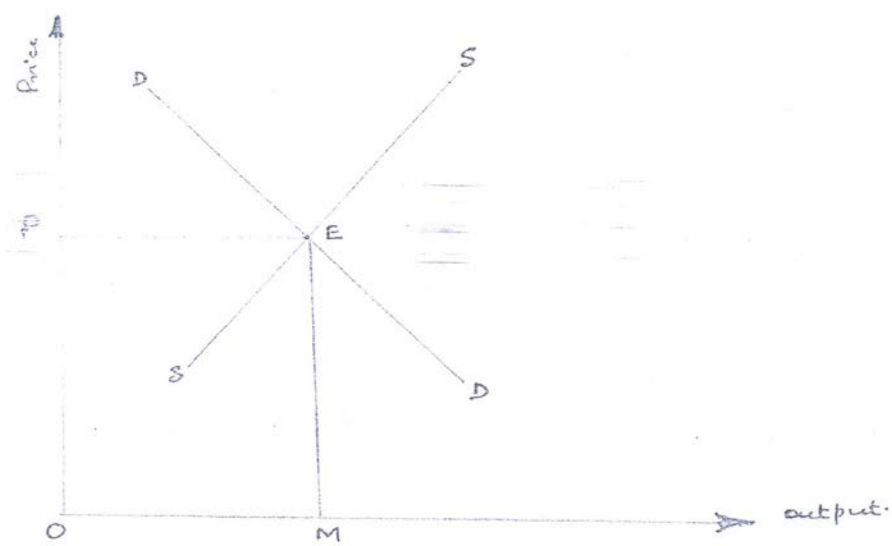
Generally price is determined by demand and supply forces. The price is determined at that point where the demand and supply both are equal under perfect competition.

The following table explains the price determination under perfect competition.

Price	Demand	Supply
5.00	200	600
4.00	300	500
3.00	400	400
2.00	500	300
1.00	600	200

In the above table if the price of the commodity is ₹5.00, then there is a demand for 200 commodities and supply is 600 commodities. If the price is 1 rupee then there is a demand for 600 commodities and supply reduced to 200 commodities. In the table at ₹ 3 price level, there is a demand for 400 commodities and the supply is also 400 commodities. Therefore the price is determined as ₹3

Diagrammatic Explanation: The price and output determination under perfect competition can be explained with the help of following diagram.



In the diagram an X-axis- output and on Y axis the price are determined. DD is the demand curve and SS is the supply cure. Both demand and supply are equal at paint E. So the price is determined as OP and output as OM.

Answer: 8 (b)

Total cost (TC) = $x^3 – 4x^2 + 7x$

Average Cost (AC) = $\frac{TC}{x} = x^2 - 4x + 7$

In order that average cost is minimum $\frac{dy}{dx} = 0$ and the value of $\frac{d^2y}{dx^2} > 0$

i. e. $\frac{dy}{dx} = 2x - 4 = 0$

$= x – 2 = 0$

Or $x = 2$

$\frac{d^2y}{dx^2} = 2$ which is positive, so the function will have minimum values.

Minimum:

Average Cost = $x^2 – 4x – 7$

$= 4 – (4 \times 2) + 7$

$= 11 – 8 = 3$

9. (a) $P = \frac{150}{q^2 + 2} - 4$ represents the demand function for a product where 'P' is the price per unit and 'g' is the quantity per unit. You have to determine the marginal revenue function.

(b) Discuss briefly the basis on which the open price discrimination is practiced. 6+6=12

Answer: 9 (a)

$$P = \frac{150}{q^2 + 2} - 4$$

$$\text{Revenue (R)} = Pq = \left(\frac{150}{q^2 + 2} - 4\right)q$$

$$= \frac{150}{q^2 + 2}q - 4q$$

$$\text{M. R} = \frac{dR}{dq} = \frac{\left(q^2 + 2\right)(150) - 150q \times 2q}{(q^2 + 2)^2} - 4$$

$$= \frac{150q^2 - 300 \times 300q^2}{(q^2 + 2)^2} - 4$$

Answer: 9 (b)

There are many bases on which the open price discrimination is practiced. These are as under: -

- **Time Price Differentials**: It is a general practice to use the expression "the demand for a product or service", but it is important 10 note that demand also has a time dimension. The demand may shift in fairly short-time intervals. For example, demand for telephone facilities is more in the day time rather than at night.
- **Use Price differentials**: Different buyers have different uses of a product or a service. For example railways can be used for long-haul or short-haul freight traffic. Railways can also be used for transporting different types of commodities. Electricity can similarly, be used for industrial or residential purposes.
- **Quality price Differentials**: If the product caters to that group of consumers who are concerned about its quality, then the quality becomes a significant determinant of demand elasticity. The seller has, therefore, to crate differences in quality to sell his product. It must be emphasized here that the differences in quality basically depend upon the buyers' understanding of the quality.
- **Quantity Differentials**: When the seller discriminates on the basis of the quantity of purchase, it is known as quantity differentials. Quantity discounts are price concessions based on the size of the lot purchased at one time and delivered at one location.